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ON THE RACIAL COMPOSITION OF WORKERS
AVAILABLE TO AN ORGANIZATION

by

Sheldon E. Haber

Serial T-351
12 May 1977



The George Washington University
School of Engineering and Applied Science
Institute for Management Science and Engineering

Program in Logistics
Contract N00014-75-C-0729
Project NR 347 020
Office of Naval Research

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Serial-T-351	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ON THE RACIAL COMPOSITION OF WORKERS AVAILABLE TO AN ORGANIZATION.	5. TYPE OF REPORT & PERIOD COVERED SCIENTIFIC / Rept.	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) SHELDON E. HABER	8. CONTRACT OR GRANT NUMBER(s) N00014-75-C-0729	
9. PERFORMING ORGANIZATION NAME AND ADDRESS THE GEORGE WASHINGTON UNIVERSITY PROGRAM IN LOGISTICS WASHINGTON, D. C. 20037	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS OFFICE OF NAVAL RESEARCH CODE 430D ARLINGTON, VA 22217	12. REPORT DATE 12 MAY 1977	13. NUMBER OF PAGES 18
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 12/29p.	15. SECURITY CLASS. (of this report) NONE	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) FAIR HIRING STANDARDS OCCUPATIONAL MOBILITY LABOR SUPPLY ANALYSIS		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) As in most nations, the labor force in the United States is composed of many diverse groups. Where it is public policy to hire workers in a non-discriminatory manner, the problem arises as to how to determine the fair-share of each group in an organization's work force. In this paper, a number of occupations are looked at; particular attention is given to the professional occupations for which inter-labor market mobility is pronounced.		

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ON THE RACIAL COMPOSITION OF WORKERS
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As in most nations, the labor force in the United States is composed of many diverse groups. Where it is public policy to hire workers in a nondiscriminatory manner, the problem arises as to how to determine the fair-share of each group in an organization's work force. In this paper, a number of occupations are looked at; particular attention is given to the professional occupations for which inter-labor market mobility is pronounced.

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ON THE RACIAL COMPOSITION OF WORKERS
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by

Sheldon E. Haber

1. Introduction

For a variety of reasons, organizations must be concerned with the labor pool that is available for replacing unproductive workers and those who quit or retire. Besides the need to make optimal decisions regarding the size and skill composition of its work force, organizations, at least in the United States, are required to hire, assign, promote, layoff, and terminate workers in a fair manner.¹ Of these distinctly different aspects of fair employment practice, the one examined in this study pertains to hiring. The particular problem addressed is how to determine the share that a minority group, in particular, blacks, would comprise of workers in nondiscriminating organizations. A number of occupations are looked at with particular attention being given to professional occupations.

¹In the discussion that follows the term organization and firms are used interchangeably. While other types of organizations must also conform to the requirements of Title VII of the Civil Rights Acts of 1964, they are not treated here.

In order to simplify the analysis, we focus on the question of whether past hiring practices of an organization have been fair. Operationally, this question is often approached by comparing the fraction that blacks comprise of a firm's current work force with the fraction they comprise of the labor force at large, where the latter is taken as a measure of fair employment in the absence of discrimination. This is a different question than asking whether an organization is meeting its social responsibility with respect to current hiring practices. To answer this question, information is needed about job seekers. Because detailed information about job seekers is sparse, the second question is not addressed here. Only the first question of determining the racial composition of the labor force at large is examined.²

In Section 1, an approach is described for determining the share of minority members among all workers in an occupation assuming the absence of discrimination. Empirical data are presented in Section 2 for a prototype organization, that of a naval repair yard, to illustrate how the approach can be utilized in a practical context. The last section contains concluding comments.

2. A Procedure for Estimating the Racial Composition of Workers in an Occupation

While most labor markets are essentially local, mobility does differ among occupations and should be considered in ascertaining labor availability. In this section, an approach is presented which

²As indicated elsewhere, labor force data can lead to misleading conclusions even in answering the first question. Here, too, data pertaining to job seekers are preferred to labor force data. (See Sheldon E. Haber, On the Use of Applicant Flow Data in Establishing Fair Employment Standards, Program in Logistics, The George Washington University, Serial T-332, 24 March 1976). When data on job seekers are unavailable, recourse must be made to labor force data.

takes account of where workers come from in estimating the racial composition of workers in a local labor market. One might expect that when mobility between local labor market is considered, the share of blacks among professional workers, and possibly other occupational groups, will be different from the share that would be estimated by looking only at individuals who currently reside in a given local labor market.

In this approach, a firm's work force is viewed as being composed of workers who come from k areas ordered in terms of distance.³ Letting L_i be the resident labor force in the i th area and b_i the percentage that blacks comprise of resident workers, the proportion of blacks in the firm's labor area would be $\sum L_i b_i / \sum L_i$. Denoting p_i as the probability that an individual in the i th area will seek work with the firm, the probability that the worker is black, $P(B)$, is given by

$$P(B) = \frac{\sum_{i=1}^k L_i p_i b_i}{\sum_{i=1}^k L_i p_i} = \frac{\sum_{i=1}^k (L_i p_i)}{\sum_{i=1}^k L_i p_i} \cdot b_i = \frac{\sum_{i=1}^k q_i b_i}{\sum_{i=1}^k q_i}, \quad (1)$$

where the denominator of the first term above is the expected number of workers of all races and the numerator is the expected number of black workers.

³The model discussed below is more fully described in Joseph L. Gastwirth and Sheldon E. Haber, "Defining the Labor Market for Equal Employment Standards", Monthly Labor Review, March 1976, pp. 32-36. The context of the present paper is different from the earlier one. The earlier paper looked at commuting within a local labor market. This paper examines mobility between local labor markets.

While it is known that the q_i decrease as distance increases, it is difficult to estimate these values directly. However, they can be estimated indirectly since

$$q_i = \frac{L_i p_i}{\sum_{i=1}^k L_i p_i}$$

is the fraction of the firm's labor pool residing in the i th area and can be calculated from mobility data.

Given the areas from which an organization draws labor, one can compute the fraction of workers coming from each area and the share of blacks in each area. As indicated in (1), these figures can then be used to obtain a weighted percentage of the work force which would be comprised of minorities assuming the absence of discrimination. The calculation can be performed for specific occupations or groups of occupations. The greater the mobility of workers, the greater is the weight given to the black share in areas distant from the Standard Metropolitan Statistical Area (SMSA) in which the organization is located;⁴ for those occupations in which there is no mobility, the computed share of blacks will be the same as the SMSA share.

To determine where people come from, i.e., the q_i in the model, we utilize information from the 1970 Census of Population pertaining to place of residence in 1965. Place of residence in 1965 is categorized

⁴By stipulating that the basic unit of observation or "home area" is an SMSA, we are assuming that the organization is located in a metropolitan area. The approach is equally applicable to organizations located in nonmetropolitan area.

as follows:

- 1a. Same SMSA, same house
- 1b. Same SMSA, different house, same county
2. Different county, same state
3. Different county, different state, same region
4. Different county, different region.

Because of the way in which the data are tabulated by the Bureau of the Census, two problems arise involving multiple-county SMSAs. For such SMSAs, individuals in Category 2 may have resided in the same SMSA in 1970 and 1965. To be conservative, individuals are classified as having lived in the more distant area, i.e., outside the SMSA but in the home state, in 1965.⁵

3. Estimates of the Racial Composition of Workers
in Naval Repair Yards

In this section, a prototype organization, namely, naval repair yards, is chosen to illustrate the proposed procedure for estimating the racial composition of workers by occupation. For convenience, only the most important occupations in naval repair yards are considered. The occupations selected are as follows:

1. Engineers
2. Accountants
3. Technicians (excluding health technicians)
4. Selected craftsmen occupations (includes boilermakers, carpenters, electricians, painters, plumbers and pipefitters, tinsmiths, shipfitters, and tool and die

⁵The problem noted is compounded for SMSAs that cross state lines; in this case, individuals in Categories 2 and 3 may also have resided in the same SMSA in 1970 and 1965. Only a small number of SMSAs cross state lines; none of these are included in the study.

- workers)
- 5. Selected operative occupations (includes specified and other machine operatives; precision machine operatives, and welders)
- 6. Laborers (except farm).

Additionally, two occupational groups with very high educational requirements are included as a control. These are

- 7. Lawyers and Physicians (includes dentists and related practitioners)
- 8. Scientists (includes life and physical scientists, mathematical specialists, operations and systems research analysts, social scientists, and college and university teachers).

Presumably, these occupational groups exhibit a great deal of mobility; thus, their labor market should be wider than that for most occupations.

Four SMSAs were selected as being representative of local areas where shipbuilding and repair work are performed. Two are located in the north -- New York and Philadelphia -- and two are located in the west -- Los Angeles - Long Beach and San Francisco - Oakland.⁶ The last three are sites of naval repair yards; New York is included because it formerly was the site of a naval repair yard and because ships are still built there. All four SMSAs are large; the smallest had a population of 3 million in 1970. The two northern and two western SMSAs also have similar percentages of blacks in their labor force.⁷

⁶The North is designated as the Northeast, Mid-Atlantic, East North Central, and West North Central states. The west includes the Mountain and Pacific states.

⁷In New York and Philadelphia the share of blacks in the labor force in 1970 was 15 and 16 percent, respectively. Similar figures for Los Angeles and San Francisco are 10 and 9 percent, respectively.

Table 1 shows the percentage of workers who resided in the sample SMSAs in 1970 by place of residence in 1965. As noted in Section 1, the four areas are mutually exclusive. The figure in the third column, 12.7 percent, is the percentage of engineers living in the Los Angeles or San Francisco SMSAs in 1970 who resided in California in 1965, but outside their home SMSA.⁸ The most important observation to be drawn from the table is the fair amount of mobility that workers exhibit over a five-year period. For example, as many as one-third of the scientists who lived in the west SMSAs in 1970 may have resided outside their home SMSAs in 1965. Even among laborers, as many as one-sixth may have resided in a place other than their home SMSA in 1965.⁹

As might be expected, a higher percentage of workers living in the western SMSAs in 1970 resided outside their home region in 1965 than workers living in the northern SMSAs. This is true for all occupational groups and reflects the fact that the former SMSAs have been growing more rapidly than the latter. It is also seen that for the western SMSAs there is a positive association between the occupational groups (ranked in terms of their socio-economic status) and the likelihood of a worker having lived outside the home region in 1965. The association is weak, however, among northern SMSAs, possibly because employment opportunities for professional workers have been expanding less rapidly in these places than elsewhere.

Having computed the q_i , the next step is to calculate the b_i . The latter are shown in Table 2. It should be noted that the percentages in this table are based on all employed persons in each area. Thus, the figure in the first column, 1.9 percent, is the black share of all employed engineers living in the two western SMSAs in 1970. Similarly, the figure

⁸The figures in Tables 1-3 are simple averages of the percentages for the two SMSAs in each region.

⁹For the Los Angeles SMSA, which is a single county SMSA, the percentage of scientists and laborers living elsewhere in 1965 is 28 and 15 percent, respectively.

Table 1
 Percentage Distribution of Employed ^{a/} by Place of
 Residence in 1965

	Sample Size <u>b/</u>	Same SMSA	Same State	Same Region	Different Region
Lawyers and Physicians					
Northern SMSAs ^{c/}	1,031	74.6	14.3	5.6	5.6
Western SMSA ^{d/}	558	73.6	8.7	2.0	15.7
Scientists					
Northern SMSAs	753	59.0	17.3	16.4	7.2
Western SMSAs	533	64.0	12.4	4.8	18.8
Engineers					
Northern SMSAs	933	73.3	11.0	6.7	10.3
Western SMSAs	969	69.0	12.7	3.6	14.7
Accountants					
Northern SMSAs	765	73.9	14.6	7.1	4.5
Western SMSAs	462	74.3	10.5	3.8	11.5
Technicians					
Northern SMSAs	629	75.2	12.9	4.5	7.4
Western SMSAs	480	72.3	10.9	3.2	13.6
Selected Craftsmen					
Northern SMSAs	1,778	86.1	8.3	2.1	3.4
Western SMSAs	1,303	84.9	7.3	1.2	4.6
Selected Operatives					
Northern SMSAs	1,180	80.3	7.3	2.5	10.0
Western SMSAs	1,000	79.7	7.5	1.9	11.0
Laborers					
Northern SMSAs	2,053	87.5	7.2	1.9	3.5
Western SMSAs	1,516	83.4	7.5	1.6	7.5

^{a/} Employed in sample SMSAs in 1970. Figures are for mutually exclusive areas.

^{b/} Total number of workers.

^{c/} New York and Philadelphia SMSAs.

^{d/} Los Angeles and San Francisco SMSAs.

Table 2
Percent of Employed ^{a/} who are Black by Place of
Residence in 1970

	<u>Same SMSA</u>	<u>Same State</u>	<u>Same Region</u>	<u>Different Region</u>
Lawyers and Physicians				
Northern SMSAs ^{b/}	3.7	2.1	1.6	2.3
Western SMSAs ^{c/}	2.0	1.5	0.7	2.1
Scientists				
Northern SMSAs	3.8	1.8	2.1	4.9
Western SMSAs	3.7	2.6	1.6	3.6
Engineers				
Northern SMSAs	2.3	2.4	1.2	1.4
Western SMSAs	1.9	1.9	0.4	1.3
Accountants				
Northern SMSAs	6.0	0.6	2.4	1.7
Western SMSAs	2.2	0.7	0.4	2.5
Technicians				
Northern SMSAs	7.8	0.6	2.7	3.1
Western SMSAs	3.5	3.0	0.5	3.1
Selected Craftsmen				
Northern SMSAs	8.2	1.5	3.1	6.8
Western SMSAs	8.3	2.9	1.0	5.3
Selected Operatives				
Northern SMSAs	21.1	2.7	10.6	14.8
Western SMSAs	11.4	4.6	2.2	12.0
Laborers				
Northern SMSAs	27.4	6.0	12.9	26.9
Western SMSAs	17.3	9.7	2.6	22.6

^{a/} Employed in each area in 1970. Figures are for mutually exclusive areas.

^{b/} New York and Philadelphia SMSAs.

^{c/} Los Angeles and San Francisco SMSAs.

Table 3
Percent of Employed Who are Black

	Actual <u>a/</u>	Model <u>b/</u>	Federal Employees <u>c/</u>	Place of Work, Central City <u>d/</u>
Lawyers and Physicians				
Northern SMSAs <u>e/</u>	3.7	3.3	3.8	4.3
Western SMSAs <u>f/</u>	2.0	1.9	4.1	3.2
Scientists				
Northern SMSAs	3.8	3.3	7.9	4.8
Western SMSAs	3.7	3.4	5.1	4.2
Engineers				
Northern SMSAs	2.3	2.2	4.8	3.3
Western SMSAs	1.9	1.8	3.8	1.9
Accountants				
Northern SMSAs	6.0	4.8	10.8	6.4
Western SMSAs	2.2	2.0	8.8	3.2
Technicians				
Northern SMSAs	7.8	6.3	11.1	10.0
Western SMSAs	3.5	3.3	8.4	4.7
Selected Craftsmen				
Northern SMSAs	8.2	7.5	13.7	11.0
Western SMSAs	8.3	7.5	19.0	10.6
Selected Operatives				
Northern SMSAs	21.1	18.9	32.6	24.7
Western SMSAs	11.4	10.8	27.0	13.7
Laborers				
Northern SMSAs	27.4	25.6	49.3	31.5
Western SMSAs	17.3	16.9	52.4	21.8

a/ Data classified by place of residence.

b/ Based on methodology in section 2. Data classified by place of residence.

c/ Published data classified by place of residence (from U.S. Department of Commerce, Census of Population: 1970, Detailed Characteristics, PC(1)-D, State Volumes, Table 173).

d/ Data classified by place of work.

e/ New York and Philadelphia SMSAs.

f/ Los Angeles and San Francisco SMSAs.

in the last column, 1.3 percent, is the black share of all employed engineers living outside the west in 1970. With few exceptions, the share of blacks is largest for the SMSA area reflecting the concentration of blacks in large urban places.

The final step in determining the share of blacks among workers in the absence of discrimination is shown in Column 2, Table 3. The figures in this column are weighted averages of the figures in Tables 1 and 2. These may be compared with the actual share of blacks among all employed workers in 1970 (Column 1). Not unexpectedly, for all occupations, the share of blacks is smaller using the model, since it takes account of mobility from areas that are "whiter" than the home SMSA.

Of interest, the relative differential between the model and actual figures is smaller for western SMSAs than for northern SMSAs.

Defining this differential as

$$1 = \frac{\% \text{ Black, Model}}{\% \text{ Black, Actual}} ,$$

one finds that the average differential, over all occupations, for the western SMSAs is six percent, for the northern SMSAs 12 percent. The reasons for this are as follows. The share of blacks outside the home region is relatively high for the western SMSAs. Moreover, for these SMSAs a large fraction of workers previously lived in the north and south. Therefore, both factors raise the model percentage more for the western SMSAs than for the northern SMSAs.

It is also seen that the relative differential is greater for professional workers than for blue-collar workers; it is 14 and nine percent, respectively, in the north, and seven and six percent, respectively, in the west. This is consistent with what is known about mobility, i.e., that professional workers are more mobile than blue-collar workers. Consequently, more weight is given to the home SMSA areas for the latter occupations and the model estimates are closer to the actual.

The most important, overall conclusion to be drawn from the model and actual estimates, however, is that the differences are quite small even for the most mobile professional occupations. If one were to choose the share of minority members among all workers employed locally in an occupation as a fair employment standard for all employers, that standard would change relatively little, after taking account of the fact that the labor market for some occupations is not strictly local.

Two alternative measures of the black share by occupation, in the absence of discrimination, are also shown in Table 3. Both yield appreciably higher standards than the model or the actual figures. The first measure, shown in Column 3, is the percentage of blacks among federal employees for northern and western SMSAs. Comparing Columns 3 and 1, one notices that in nine of the 16 observations the figures in the former column are twice as large as those in the latter, and in all occupations except one, the relative differential (federal employees \div actual) exceeds one-third. Since naval repair yard workers are federal employees, one should look at the racial composition of federal employees, not private sector workers, to determine if a federal activity has been a fair employer. Indeed, if it is granted that the private sector discriminates to a greater extent than the public sector, then, in the absence of discrimination, the share of blacks in the former should, with adjustments in supply to demand and sufficient time, approximate the share in the latter. In the process of adjustment, the share of blacks in the public sector may decline as employment opportunities for minority members increase in the public sector. In this case, the long-run goals for private sector employers would be adjusted downward.

Even if personnel practices of public and private employers were exactly the same, one would expect the share of blacks among naval repair yard employees to be higher than the SMSA-wide average, since repair yards are typically located in central cities and draw workers from a labor pool having a large percentage of minority members than firms located in the suburbs. One way of treating this aspect of fair hiring is to use place-of-work data instead of place-of-residence data. In taking this

tack, it is assumed that a central city firm hires only from among individuals who (a) live and work in the central city or (b) live in the suburbs but commute to the central city.¹⁰ That is to say, it is assumed that place-of-work data reflect individual decisions as to where to work which, in turn, are based on commuting time and costs. As these costs can be high, individuals tend to take jobs close to home.¹¹ This is one reason, among several, why the labor pool of central cities is blacker than that of suburban areas.¹² As can be seen from Table 3, when place-of-work data are used instead of place-of-residence data, the relative differential (place of work, central city \div actual) exceeds one-quarter in almost two-thirds of the observations. From this brief discussion, it should be clear that there are methodological issues in using labor force data to derive fair employment standards that outweigh the issue of how to adjust the data to take account of inter-labor market mobility.

¹⁰Likewise, a suburban firm would be assumed to hire from among individuals who (a) live and work in the suburbs or (b) live in the central city but commute to the suburbs. This assumption seems reasonable for many suburban firms. Discriminating firms could, however, reduce the flow of central city workers to the suburbs, thereby distorting suburban place of work data. This distortion can be large for suburban firms that are located near a central city.

¹¹See U.S. Department of Labor, Jobseeking Methods of American Workers, Bureau of Labor Statistics, Bulletin 1886, 1975, Table H-7.

¹²See Joseph L. Gastwirth and Sheldon E. Haber, op. cit.

4. Summary and Concluding Comments

In this paper a methodology is presented for determining the racial composition of the labor force in a local area taking account of inter-labor market mobility. The available labor pool is measured in terms of where workers come from. As indicated in the analysis, the bulk of employed persons, including those in the professional occupations, are drawn from nearby areas; in the case of a metropolitan firm, the most immediate area is the SMSA in which it is located.

Information on the areas from which workers come and information on the racial composition of employed persons in each area are used to estimate the proportion of a firm's work force that would be comprised of blacks in the absence of discrimination. It is found that professional workers are, indeed, more mobile than blue-collar workers and that accounting for mobility reduces the share of black workers available to local areas, at least for large SMSAs. While this is not surprising, it is also found that the reduction is small, even for professional workers. For professional workers, the reduction in the black share average 14 percent for the northern SMSAs and seven percent for the western SMSAs examined in this study.

Other ways of determining fair hiring standards yield markedly higher estimates of the racial composition of employed persons in this paper, i.e., a naval repair shipyard, it is more appropriate to look at the racial composition of federal employees (rather than all employees) in determining fair hiring standards. It can be argued, moreover, that, all other things being equal, the racial composition of workers in private organizations should be the same as that in government activities.

Still another way to determine the racial composition of a firm's work force in the absence of discrimination is to take account of its location, i.e., if it is located in the central city or the suburbs of an SMSA. If a firm is located in the central city of an SMSA, the racial composition of its work force should approach the racial composition of individuals whose place of work is in the city.

While the complexities of establishing fair hiring standards have been examined in this paper, others have not. For example, labor force data show the inventory of workers attached to an occupation. They can be misleading, therefore, if an organization hires untrained individuals and then trains them for jobs in which a high degree of skill is ultimately required. In this case, the racial composition of the firm's workers should reflect the racial composition of qualified applicants for entry level positions rather than the racial composition of all employees in the occupation. Thus, underlying the fair employment standards developed in the study is the assumption that firms hire only workers that have acquired the skills of their occupation prior to time of hire.

Labor force data can also be misleading in another way, since Census data do not count all persons who have or could have acquired the skills necessary for employment in a given occupation. For example, the proportion of craftsmen who are black may not reflect the percentage of blacks among the population at large who could qualify for jobs as craftsmen in the absence of discrimination by organizations. In this case, the skills could have been acquired in the military or, more likely, they could have been learned in the performance of nonmarket work. Similarly, the proportion of blacks among bookkeepers and accountants may be low, not because of the unavailability of blacks who can qualify for this type of work, but because such jobs tend to be restricted to whites. The supply of black bookkeepers can be expanded rather quickly; to increase the supply of black accountants requires more time, but there is no reason to assume that it, too, cannot be expanded in a short period, say, a few years. Neither of these possibilities is reflected in the Census data. Space limitations preclude the analysis of this problem here; it will be examined in a subsequent paper.

Another problem is that the vast bulk of the labor force is employed. Hence, such data, as conventionally portrayed, have only limited potential in terms of providing detailed information about job seekers, particularly at the local labor market level. The problem of determining the racial composition of job seekers, as distinct from the labor force, is also beyond the present analysis. Again, a separate study is required.

It should also be noted that even when labor force data are properly used to draw inferences regarding job seekers, they pertain to employers as a whole rather than individual employers. The best data for this purpose are firm-specific information on individuals applying for jobs, i.e., applicant flow data. Applicant flow data, however, are not always available; in their absence, one has to use labor force data..

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